

WHAT IS CLAIMED IS:

1. A conversion apparatus for converting a file of a format including a header, a body, and a footer, comprising:

conversion means for converting one of a file of a first format, which includes first and second data placed in a multiplexed state in the body, and a file of a second format, which includes first or second data collectively placed in the body into the other of the files.

2. The conversion apparatus according to claim 1, wherein said conversion means includes first format conversion means for converting a file of the first format into a file of the second format.

3. The conversion apparatus according to claim 2, wherein the first and second data are video data and audio data, respectively.

4. The conversion apparatus according to claim 3, wherein said first format conversion means includes:

video data extraction means for extracting the video data multiplexed with the audio data in a file of the first format;

video data coupling means for coupling the video data extracted by said video data extraction means; and

video header/footer addition means for adding a header and a footer of a form same as that of a file of the first format to a body provided by the video data coupled by said video data coupling means to prepare a video file of said video data.

5. The conversion apparatus according to claim 4, wherein said first format conversion means further includes file preparation means for preparing a master file describing a pointer to the video file.

6. The conversion apparatus according to claim 3, wherein the audio data in a file of the first format are channel-multiplexed audio data formed from audio data of a plurality of channels multiplexed with each other, and said first format conversion means includes:

audio data extraction means for extracting the channel-multiplexed audio data multiplexed with the video data in a file of the first file format;

audio data separation means for separating the channel-multiplexed audio data extracted by said audio data extraction means into the audio data of the individual channels; and

audio header/footer addition means for adding a header and a footer of a form same as that of a file of the first format to a body provided by the audio data of

each of the channels to prepare audio files of the audio data for the individual channels.

7. The conversion apparatus according to claim 6, wherein the channel-multiplexed audio data in a file of the first format are Key, Length, and Value (KLV)-encoded data, and said first format conversion means includes:

KLV structure decomposition means for decomposing a KLV structure of the KLV-encoded channel-multiplexed audio data extracted by said audio data extraction means and supplying resulting audio data to said audio data separation means; and

KLV structuring means for KLV-encoding the audio data of the channels obtained by said audio data separation means so as to individually have a KLV structure;

said audio header/footer addition means adding a header and a footer to a body provided by the audio data of each of the channels structured by said KLV structuring means so as to have a KLV structure.

8. The conversion apparatus according to claim 6, wherein the audio data of a file of the first format are data encoded by a first coding method, and said first format conversion means further includes audio data conversion means for converting the audio data of the

channels coded by the first coding method and obtained by said audio data separation means into audio data of the channels encoded by a second coding method.

9. The conversion apparatus according to claim 6, wherein said first format conversion means further includes file preparation means for preparing a master file describing pointers to the audio files of the channels.

10. The conversion apparatus according to claim 3, wherein the body of a file of the first format has metadata placed therein in a form multiplexed together with the video data and the audio data, and said first format conversion means further includes metadata file preparation means for preparing a metadata file in which the metadata multiplexed in the bodies of a file of the first format are collectively placed.

11. The conversion apparatus according to claim 10, wherein said first format conversion means further includes file preparation means for preparing a master file describing a pointer to the metadata file.

12. The conversion apparatus according to claim 2, further comprising recording means for recording a file of the second format obtained by said second format conversion means onto a recording medium.

13. The conversion apparatus according to claim 1, wherein said conversion means includes second format conversion means for converting a file of the second format into a file of the first format.

14. The conversion apparatus according to claim 13, wherein the first and second data are video data and audio data, respectively.

15. The conversion apparatus according to claim 14, wherein a file of the second format includes a video file wherein a header and a footer of a form same as that of a file of the first format is added to the body in which the video data are placed collectively, and audio files for audio data of a plurality of channels in each of which a header and a footer of a form same as that of a file of the first format is added to the body in which the audio data of the channel are placed collectively, and said second format conversion means includes:

video header/footer removal means for removing the header and the footer from the video file;

video data decomposition means for decomposing the video data of the video file into video data of units to be multiplexed with the audio data;

audio header/footer removal means for removing the headers and the footers from the audio files;

channel multiplexing means for multiplexing the audio data of the channels of the audio files and outputting resulting channel-multiplexed audio data;

data multiplexing means for multiplexing the video data obtained by said video data decomposition means and the channel-multiplexed audio data obtained by said channel multiplexing means; and

header/footer addition means for adding a header and a footer of a file of the first format to a body provided by the data obtained by said data multiplexing means.

16. The conversion apparatus according to claim 15, wherein the audio data of the audio files in a file of the second format is KLV-encoded audio data, and said second format conversion means further includes:

KLV structure decomposition means for decomposing a KLV structure of the KLV-encoded audio data; and

KLV structuring means for KLV-encoding the channel-multiplexed audio data into audio data of the KLV structure in a unit to be multiplexed with the video data.

17. The conversion apparatus according to claim 15, wherein the audio data in a file of the second format are data encoded by a second coding method from between first and second coding methods, and said second format

conversion means further includes audio data conversion means for converting the audio data of the audio files from audio data encoded by the second coding method into audio data encoded by the first coding method.

18. The conversion apparatus according to claim 15, wherein a file of the second format further includes a metadata file in which the metadata are placed collectively, and said data multiplexing means multiplexes not only the video data and the channel-multiplexed audio data but also the metadata.

19. The conversion apparatus according to claim 13, further comprising transmission means for transmitting the file of the first format obtained by said second format conversion means through a transmission medium.

20. The conversion apparatus according to claim 1, wherein the first format is the Material Exchange Format (MXF).

21. A conversion apparatus for converting a file of a format including a header, a body, and a footer, comprising:

a converter for converting one of a file of a first format, which includes first and second data placed in a multiplexed state in the body, and a file of a second format, which includes first or second data collectively

placed in the body into the other of the files.

22. The conversion apparatus according to claim 21, wherein said converter includes a first format converter for converting a file of the first format into a file of the second format.

23. The conversion apparatus according to claim 22, wherein the first and second data are video data and audio data, respectively.

24. The conversion apparatus according to claim 23, wherein said first format converter includes:

- a video data extractor for extracting the video data multiplexed with the audio data in a file of the first format;

- a video data coupler for coupling the video data extracted by said video data extractor; and

- a video header/footer adder for adding a header and a footer of a form same as that of a file of the first format to a body provided by the video data coupled by said video data coupler to prepare a video file of said video data.

25. The conversion apparatus according to claim 24, wherein said first format converter further includes a file preparator for preparing a master file describing a pointer to the video file.



26. The conversion apparatus according to claim 23, wherein the audio data in a file of the first format are channel-multiplexed audio data formed from audio data of a plurality of channels multiplexed with each other, and said first format converter includes:

audio data extractor for extracting the channel-multiplexed audio data multiplexed with the video data in a file of the first file format;

an audio data separator for separating the channel-multiplexed audio data extracted by said audio data extractor into the audio data of the individual channels; and

an audio header/footer adder for adding a header and a footer of a form same as that of a file of the first format to a body provided by the audio data of each of the channels to prepare audio files of the audio data for the individual channels.

27. The conversion apparatus according to claim 26, wherein the channel-multiplexed audio data in a file of the first format are KLV-encoded data, and said first format converter includes:

a KLV structure decomposer for decomposing a KLV structure of the KLV-encoded channel-multiplexed audio data extracted by said audio data extractor and supplying

resulting audio data to said audio data separator; and

a KLV structurer for KLV-encoding the audio data of the channels obtained by said audio data separator so as to individually have a KLV structure;

said audio header/footer adder adding a header and a footer to a body provided by the audio data of each of the channels structured by said KLV structurer so as to have a KLV structure.

28. The conversion apparatus according to claim 26, wherein the audio data of a file of the first format are data encoded by a first coding method, and said first format converter further includes an audio data converter for converting the audio data of the channels coded by the first coding method and obtained by said audio data separator into audio data of the channels encoded by a second coding method.

29. The conversion apparatus according to claim 26, wherein said first format converter further includes file preparator for preparing a master file describing pointers to the audio files of the channels.

30. The conversion apparatus according to claim 23, wherein the body of a file of the first format has metadata placed therein in a form multiplexed together with the video data and the audio data, and said first

format converter further includes metadata file preparator for preparing a metadata file in which the metadata multiplexed in the bodies of a file of the first format are collectively placed.

31. The conversion apparatus according to claim 30, wherein said first format converter further includes file preparator for preparing a master file describing a pointer to the metadata file.

32. The conversion apparatus according to claim 22, further comprising a recorder for recording a file of the second format obtained by said second format converter onto a recording medium.

33. The conversion apparatus according to claim 21, wherein said converter includes a second format converter for converting a file of the second format into a file of the first format.

34. The conversion apparatus according to claim 33, wherein the first and second data are video data and audio data, respectively.

35. The conversion apparatus according to claim 34, wherein a file of the second format includes a video file wherein a header and a footer of a form same as that of a file of the first format is added to the body in which the video data are placed collectively, and audio files

for audio data of a plurality of channels in each of which a header and a footer of a form same as that of a file of the first format is added to the body in which the audio data of the channel are placed collectively, and said second format converter includes:

- a video header/footer remover for removing the header and the footer from the video file;

- a video data decomposer for decomposing the video data of the video file into video data of units to be multiplexed with the audio data;

- an audio header/footer remover for removing the headers and the footers from the audio files;

- a channel multiplexer for multiplexing the audio data of the channels of the audio files and outputting resulting channel-multiplexed audio data;

- a data multiplexer for multiplexing the video data obtained by said video data decomposer and the channel-multiplexed audio data obtained by said channel multiplexer; and

- a header/footer adder for adding a header and a footer of a file of the first format to a body provided by the data obtained by said data multiplexer.

36. The conversion apparatus according to claim 35, wherein the audio data of the audio files in a file of

the second format is KLV-encoded audio data, and said second format converter further includes:

a KLV structure decomposer for decomposing a KLV structure of the KLV-encoded audio data; and

a KLV structurer for KLV-encoding the channel-multiplexed audio data into audio data of the KLV structure in a unit to be multiplexed with the video data.

37. The conversion apparatus according to claim 35, wherein the audio data in a file of the second format are data encoded by a second coding method from between first and second coding methods, and said second format converter further includes an audio data converter for converting the audio data of the audio files from audio data encoded by the second coding method into audio data encoded by the first coding method.

38. The conversion apparatus according to claim 35, wherein a file of the second format further includes a metadata file in which the metadata are placed collectively, and said data multiplexer multiplexes not only the video data and the channel-multiplexed audio data but also the metadata.

39. The conversion apparatus according to claim 33, further comprising a transmitter for transmitting the file of the first format obtained by said second format

converter through a transmission medium.

40. The conversion apparatus according to claim 21, wherein the first format is the MXF.

41. A conversion method for converting a file of a format including a header, a body, and a footer, comprising the steps of:

receiving one of a file of a first format wherein first and second data are placed in a multiplexed state in the body and a file of a second format wherein first or second data are placed collectively in the body; and

converting one of the file of the first format and the file of the second format into the other of the files.

42. The conversion method according to claim 41, wherein the conversion step includes a first format conversion step of converting a file of the first format into a file of the second format.

43. The conversion method according to claim 42, wherein the first and second data are video data and audio data, respectively.

44. The conversion method according to claim 43, wherein the first format conversion step includes:

a video data extraction step of extracting the video data multiplexed with the audio data in a file of the first format;

a video data coupling step of coupling the video data extracted by the video data extraction step; and

a video header/footer addition step of adding a header and a footer of a form same as that of a file of the first format to a body provided by the video data coupled by the video data coupling step to prepare a video file of said video data.

45. The conversion method according to claim 44, wherein the first format conversion step further includes a file preparation step of preparing a master file describing a pointer to the video file.

46. The conversion method according to claim 43, wherein the audio data in a file of the first format are channel-multiplexed audio data formed from audio data of a plurality of channels multiplexed with each other, and the first format conversion step includes:

an audio data extraction step of extracting the channel-multiplexed audio data multiplexed with the video data in a file of the first file format;

an audio data separation step of separating the channel-multiplexed audio data extracted by the audio data extraction step into the audio data of the individual channels; and

an audio header/footer addition step of adding a

header and a footer of a form same as that of a file of the first format to a body provided by the audio data of each of the channels to prepare audio files of the audio data for the individual channels.

47. The conversion method according to claim 46, wherein the channel-multiplexed audio data in a file of the first format are KLV-encoded data, and the first format conversion step includes:

- a KLV structure decomposition step of decomposing a KLV structure of the KLV-encoded channel-multiplexed audio data extracted by the audio data extraction step and supplying resulting audio data to the audio data separation step; and

- a KLV structuring step of KLV-encoding the audio data of the channels obtained by the audio data separation step so as to individually have a KLV structure;

- the audio header/footer addition step adding a header and a footer to a body provided by the audio data of each of the channels structured by the KLV structuring step so as to have a KLV structure.

48. The conversion method according to claim 46, wherein the audio data of a file of the first format are data encoded by a first coding method, and the first



format conversion step further includes an audio data conversion step of converting the audio data of the channels coded by the first coding method and obtained by the audio data separation step into audio data of the channels encoded by a second coding method.

49. The conversion method according to claim 46, wherein the first format conversion step further includes a file preparation step of preparing a master file describing pointers to the audio files of the channels.

50. The conversion method according to claim 43, wherein the body of a file of the first format has metadata placed therein in a form multiplexed together with the video data and the audio data, and the first format conversion step further includes a metadata file preparation step of preparing a metadata file in which the metadata multiplexed in the bodies of a file of the first format are collectively placed.

51. The conversion method according to claim 50, wherein the first format conversion step further includes a file preparation step of preparing a master file describing a pointer to the metadata file.

52. The conversion method according to claim 42, further comprising a recording step of recording a file of the second format obtained by the second format

conversion step onto a recording medium.

53. The conversion method according to claim 41, wherein the conversion step includes a second format conversion step of converting a file of the second format into a file of the first format.

54. The conversion method according to claim 53, wherein the first and second data are video data and audio data, respectively.

55. The conversion method according to claim 54, wherein a file of the second format includes a video file wherein a header and a footer of a form same as that of a file of the first format is added to the body in which the video data are placed collectively, and audio files for audio data of a plurality of channels in each of which a header and a footer of a form same as that of a file of the first format is added to the body in which the audio data of the channel are placed collectively, and the second format conversion step includes:

a video header/footer removal step of removing the header and the footer from the video file;

a video data decomposition step of decomposing the video data of the video file into video data of units to be multiplexed with the audio data;

an audio header/footer removal step of removing the

headers and the footers from the audio files;

a channel multiplexing step of multiplexing the audio data of the channels of the audio files and outputting resulting channel-multiplexed audio data;

a data multiplexing step of multiplexing the video data obtained by the video data decomposition step and the channel-multiplexed audio data obtained by the channel multiplexing step; and

a header/footer addition step of adding a header and a footer of a file of the first format to a body provided by the data obtained by the data multiplexing step.

56. The conversion method according to claim 55, wherein the audio data of the audio files in a file of the second format is KLV-encoded audio data, and the second format conversion step further includes:

a KLV structure decomposition step of decomposing a KLV structure of the KLV-encoded audio data; and

a KLV structuring step of KLV-encoding the channel-multiplexed audio data into audio data of the KLV structure in a unit to be multiplexed with the video data.

57. The conversion method according to claim 55, wherein the audio data in a file of the second format are data encoded by a second coding method from between first

and second coding methods, and the second format conversion step further includes an audio data conversion step of converting the audio data of the audio files from audio data encoded by the second coding method into audio data encoded by the first coding method.

58. The conversion method according to claim 55, wherein a file of the second format further includes a metadata file in which the metadata are placed collectively, and the data multiplexing step multiplexes not only the video data and the channel-multiplexed audio data but also the metadata.

59. The conversion method according to claim 53, further comprising a transmission step of transmitting the file of the first format obtained by the second format conversion step through a transmission medium.

60. The conversion method according to claim 41, wherein the first format is the MXF.

61. A program for causing a computer to execute a conversion method for converting a file of a format including a header, a body, and a footer, said program comprising:

a conversion step of converting one of a file of a first format, which includes first and second data placed in a multiplexed state in the body, and a file of a

second format, which includes first or second data collectively placed in the body, into the other of the files.

62. A data structure of a file of a format including a header, a body, and a footer, comprising:

a video file wherein a header and a footer are added to a body in which video data are placed collectively;

audio files for a plurality of channels in each of which a header and a footer are added to a body in which audio data of the channel are placed; and

a master file describing a pointer to the video file and pointers to the individual audio files of the channels.